

# QUICK REVISION MODULE (UPSC PRELIMS 2022) ENVIRONMENT





- According to the UNEP, Climate Change Mitigation refers to efforts to reduce or prevent emission of greenhouse gases.
- Mitigation can mean using new technologies and renewable energies, making older equipment more energy efficient, or changing management practices or consumer behavior.

SECTORS	MITIGATION STRATEGIES
 <b>Energy System</b>	<ul style="list-style-type: none"> <li>Energy efficiency improvements and fugitive emission reductions in fuel extraction as well as in energy conversion, transmission, and distribution systems.</li> <li>Fossil fuel switching and low-GHG energy supply technologies such as renewable energy (RE), nuclear power, and carbon dioxide capture and storage (CCS).</li> </ul>
 <b>Transport Sector</b>	<ul style="list-style-type: none"> <li>Modal shift to lower-carbon transport systems</li> <li>Lowering energy intensity (MJ/passenger km or MJ/tonne km)</li> <li>Reducing carbon intensity of fuels (CO<sub>2</sub> eq/MJ)</li> <li>Behavioral change- avoiding journeys where possible</li> </ul>
 <b>Buildings</b>	<ul style="list-style-type: none"> <li>Carbon Efficiency- Fuel switching to low-carbon fuels</li> <li>Energy efficiency of technology- Efficient appliances, efficient lighting, efficient heating, ventilation &amp; air conditioning systems, smart meters &amp; smart grids.</li> <li>System/infrastructure efficiency- nearly/net zero &amp; energy plus buildings, urban planning.</li> </ul>
 <b>Industry</b>	<ul style="list-style-type: none"> <li>Energy efficiency</li> <li>Emissions efficiency</li> <li>Material efficiency in production by reducing yield losses in materials production, manufacturing, and construction and Re-using old material</li> <li>Material efficiency in product design</li> <li>Reducing overall demand for product services</li> </ul>
 <b>Forestry</b>	<ul style="list-style-type: none"> <li>Conservation of existing Carbon pools in forest vegetation and soil by controlling deforestation protecting forest in reserves</li> <li>Improved biomass stocks by planting trees on non-forested agricultural lands. This can include either monocultures or mixed species plantings.</li> <li>Management of forests for sustainable timber production including extending rotation cycles, reducing damage to remaining trees, reducing logging waste, implementing soil conservation practices, fertilization, etc.</li> <li>Protecting secondary forests and other degraded forests whose biomass and soil carbon densities are less than their maximum value and allowing them to sequester carbon by natural or artificial regeneration, rehabilitation of degraded lands, long-term fallows.</li> </ul>
 <b>Cropland Management</b>	<ul style="list-style-type: none"> <li>High input carbon practices, e.g. improved crop varieties, crop rotation, use of cover crops, perennial cropping systems, agricultural biotechnology.</li> <li>Improved water availability in cropland including water harvesting and application.</li> <li>Drainage management to reduce emissions, reduce Nitrogen runoff</li> <li>Replanting to native grasses and trees. Increase Carbon sequestration</li> </ul>





- ☀ Biochar Application
- ☀ Use of animal manures and other biosolids for improved management of nitrogen; integrated livestock agriculture techniques.
- ☀ Agroforestry (including agropastoral and agrosilvopastoral systems)
- ☀ Integration of biomass production with subsequent processing in food and bioenergy sectors.



### Demand side mitigation

- ☀ Reduced losses in the food supply chain and in final consumption reduces energy use and GHG emissions from agriculture, transport, storage and distribution, and reduce land demand.
- ☀ Changes in human diets towards less emission intensive products.

## Negative Emission Technologies

### Major Strategies For Negative Emission Technologies

#### NATURAL Forestry / Agriculture

- ☀ **Afforestation/ Reforestation** Tree growth takes up CO<sub>2</sub> from the atmosphere
- ☀ **Other Land-use/Wetlands** Restoration or construction of high carbon density, anaerobic ecosystems
- ☀ **Soil carbon sequestration** Land management changes increase the soil carbon content, resulting in a net removal of CO<sub>2</sub> from the atmosphere
- ☀ **Biochar** Partly burnt biomass is added to soil absorbing additional CO<sub>2</sub>

- ♦ Less costly ♦ Closer to deployment
- ♦ More vulnerable to reversal



#### COMBINED Natural+ Technological

- ☀ **Bioenergy with Carbon Capture & Storage (BECCS)** Plants turn CO<sub>2</sub> into biomass that fuels energy systems; CO<sub>2</sub> from conversion is stored underground.



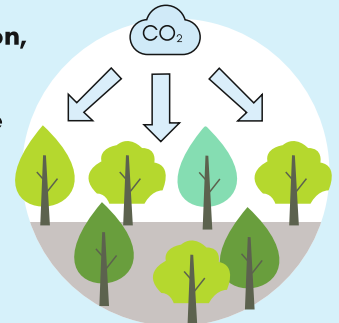
#### TECHNOLOGICAL Energy / Industry

- ☀ **Accelerated Weathering** Natural minerals react with CO<sub>2</sub> and bind them in new minerals.
- ☀ **Ocean Alkalinity Enhancement** Alkaline materials are added to the ocean to enhance atmospheric drawdown and negate acidification
- ☀ **Direct Air-Capture** CO<sub>2</sub> is removed from ambient air and stored underground.
- ☀ **CO<sub>2</sub> to durable carbon** CO<sub>2</sub> is removed from the atmosphere & bound in long-lived materials



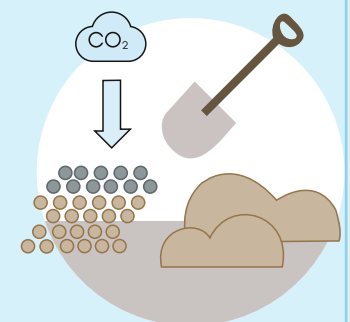
- ♦ More costly ♦ Greater R&D needs ♦ Less vulnerable to reversal

**Afforestation, reforestation, forest management** and wood utilisation Tree remove CO<sub>2</sub> can be stored in trees, soil and wood products.



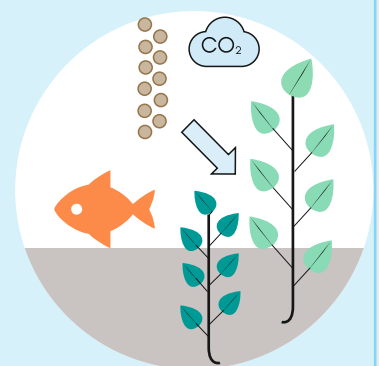
#### Enhanced weathering

Crushed minerals bind CO<sub>2</sub> chemically and can then be stored in products, in the soil or in the sea.



#### Ocean fertilisation

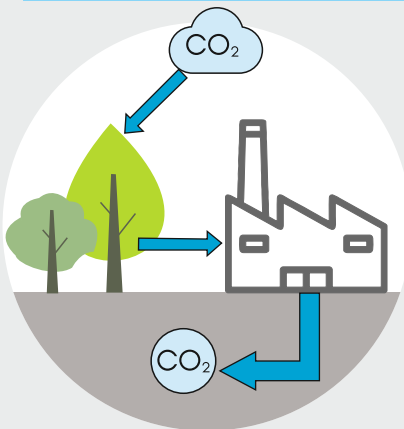
Iron or other nutrients are added to the ocean to increase the absorption of CO<sub>2</sub> by algae.



# Carbon Capture and Storage Methods

## Bioenergy with Carbon Capture and Storage (BECCS)

**Bioenergy with carbon capture and storage (BECCS)** Plants convert  $\text{CO}_2$  into biomass, with provides energy.  $\text{CO}_2$  is captured and stored underground.



Atmospheric carbon dioxide

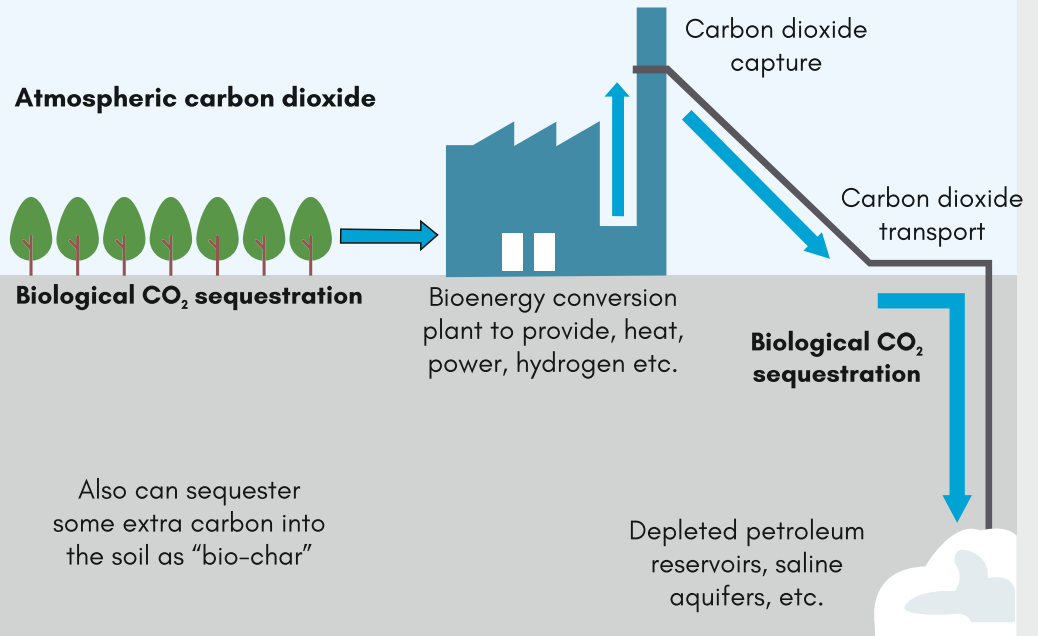
Biological  $\text{CO}_2$  sequestration

Bioenergy conversion plant to provide, heat, power, hydrogen etc.

Biological  $\text{CO}_2$  sequestration

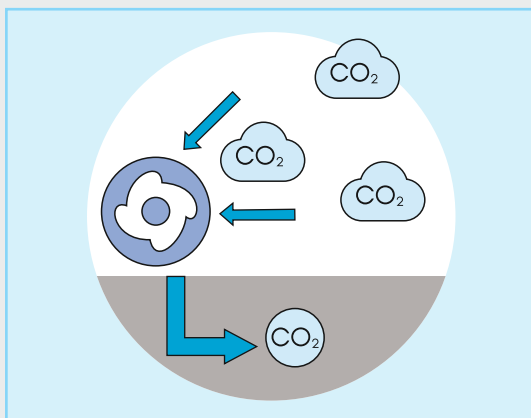
Depleted petroleum reservoirs, saline aquifers, etc.

Also can sequester some extra carbon into the soil as "bio-char"



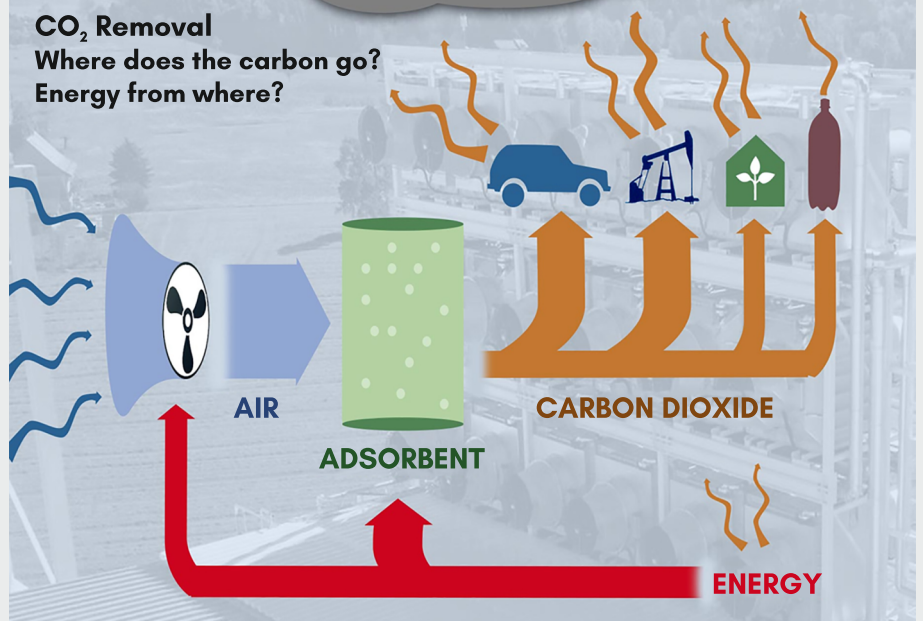
## Direct Air Capture Carbon Capture and Storage (DACCS)

**Direct air capture carbon capture and storage (DACCS)**  $\text{CO}_2$  is extracted from the ambient air by chemical processes and chemical processes and stored underground.

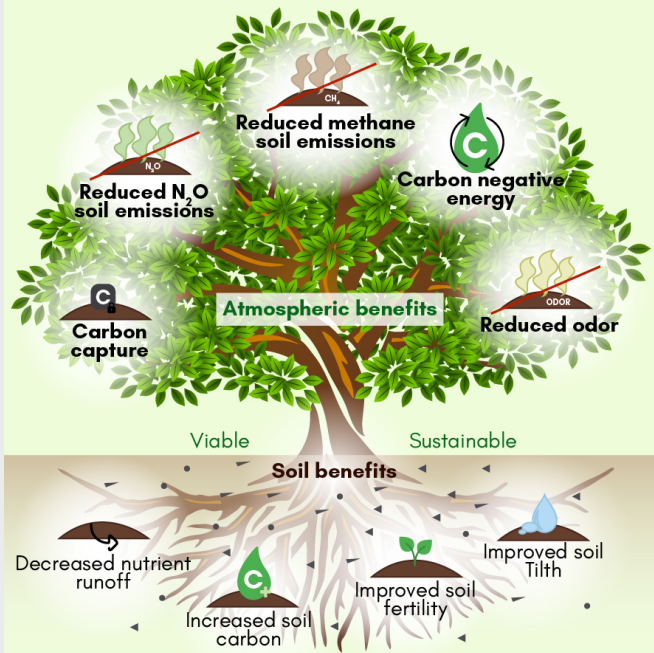


$\text{CO}_2$  RE ENTERS ATMOSPHERE

$\text{CO}_2$  Removal  
Where does the carbon go?  
Energy from where?

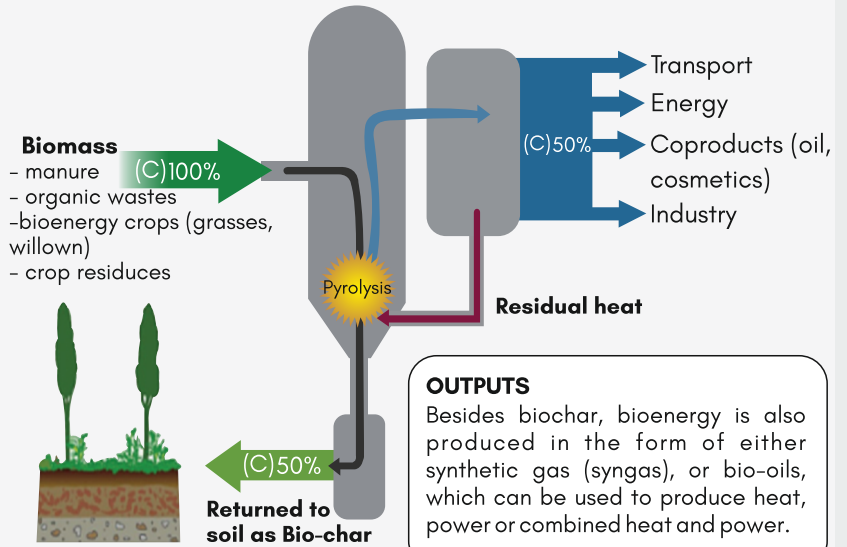


## BIOCHAR



### FEED STOCKS

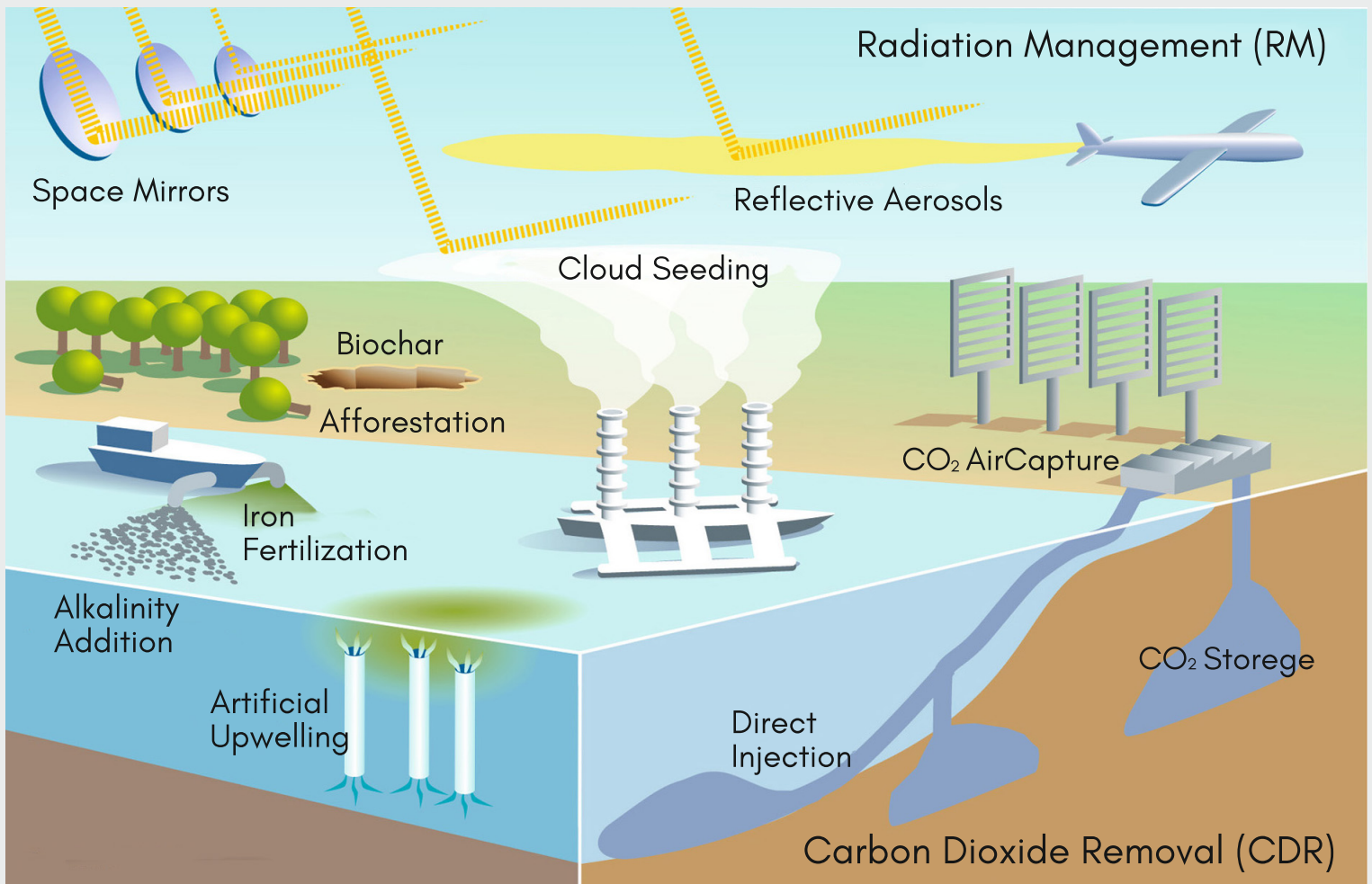
Biochar production processes utilize cellulosic biomass such as wood chips, corn stover, rice and peanut hulls, tree bark, paper mill sludge, animal manure and most urban, agricultural and forestry bio-mass residues.



### OUTPUTS

Besides biochar, bioenergy is also produced in the form of either synthetic gas (syngas), or bio-oils, which can be used to produce heat, power or combined heat and power.

## Geo-Engineering







# Carbon Pricing

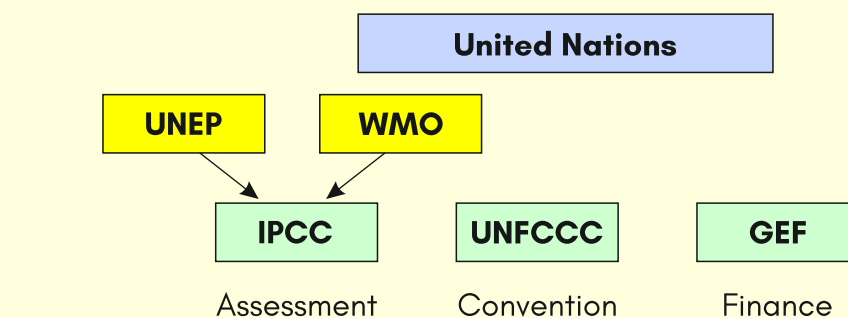
## Types of Carbon Pricing

<b>Emissions Trading Systems (ETS)</b>	It caps the total level of GHG emissions and allows those industries with low emissions to sell their extra allowances to larger emitters.
<b>A carbon tax</b>	It directly sets a price on carbon by defining a tax rate on GHG emissions or – more commonly – on the carbon content of fossil fuels.
<b>Other mechanisms</b>	An <b>offset mechanism</b> designates the GHG emission reductions from project- or program-based activities, which can be sold either domestically or in other countries. Offset programs issue carbon credits according to an accounting protocol and have their own registry. These credits can be used to meet compliance under an international agreement, domestic policies or corporate citizenship objectives related to GHG mitigation.
	<b>Results-Based Climate Finance (RBCF)</b> is a funding approach where payments are made after pre-defined outputs or outcomes related to managing climate change, such as emission reductions. Many RBCF programs also simultaneously aim to reduce poverty, improve access to clean energy and offer health and community benefits.
	<b>Internal carbon pricing</b> is a tool an organization uses internally to guide its decision-making process in relation to climate change impacts, risks and opportunities.

## International Efforts for Climate Change Mitigation

### International Processes: Climate Change

UN  
Framework  
Convention  
on Climate  
Change  
(UNFCCC)



#### Other international Organization within and outside UN:

- ☀ UN Secretary General
- ☀ UN Department of Economic and Social Affairs
- ☀ UN Habitat
- ☀ UN Industrial Development Organization
- ☀ World Bank
- ☀ World Health Organization
- ☀ World Trade Organization
- ☀ Food and Agriculture Organization

COP is supreme body of UNFCCC  
UNFCCC is a freestanding entity – not a "subsidiary" of UN.



## Conference of the Parties (COP)

It is the supreme decision-making body of the Convention. All States that are Parties to Convention is represented at COP. It meets every year, unless the Parties decide otherwise.

### Kyoto CoP 3, 1997

#### ☀ **Kyoto Protocol:**

- ☀ Annex-based structure
- ☀ Only binds developed countries
- ☀ Based on principle of "common but differentiated responsibility and respective capabilities"
- ☀ In its Annex B, the Kyoto Protocol sets binding emission reduction targets for 37 industrialized countries and economies in transition and the European Union.
- ☀ These targets add up to an average 5% emission reduction compared to 1990 levels over the five year period 2008–2012 (the first commitment period).

Kyoto Mechanisms	Classification of Parties to the Kyoto Protocol
<ul style="list-style-type: none"> <li>☀ <b>International Emissions Trading:</b> allows parties to buy 'Kyoto units' from other countries to help meet their domestic emission reduction targets.</li> <li>☀ <b>Clean Development Mechanism (CDM):</b> Countries can meet their domestic emission reduction targets by buying 'Kyoto units' from (projects in) non-Annex I countries.</li> <li>☀ <b>Joint implementation (JI):</b> Any Annex country can invest in emission reduction projects (referred to as "Joint Implementation Projects") in any other Annex I country as an alternative to Reducing Emissions Domestically.</li> <li>☀ <b>The Adaptation Fund:</b> to finance adaptation projects and programmes in developing countries. Fund was financed mainly with a share of proceeds from CDM project activities.</li> </ul>	<ul style="list-style-type: none"> <li>☀ <b>Annex I:</b> These are the industrialized (developed) countries and "economies in transition" (EITs). EITs are the former centrally-planned (Soviet) economies of Russia and Eastern Europe. The European Union-15 (EU-15) is also an Annex I Party.</li> <li>☀ <b>Annex II</b> Parties are made up of members of the Organization for Economic Cooperation and Development (OECD). Annex II Parties are required to provide financial resources to enable developing countries in reducing their greenhouse gas emissions (climate change mitigation) and manage the impacts of climate change (climate change adaptation)</li> <li>☀ <b>Annex B:</b> Parties listed in Annex B of the Kyoto Protocol are Annex I Parties with first or second round Kyoto greenhouse gas emissions targets.</li> <li>☀ <b>Non-Annex I:</b> Parties to the UNFCCC not listed in Annex I of the Convention are mostly low-income developing countries. Developing countries may volunteer to become Annex I countries when they are sufficiently developed.</li> <li>☀ <b>Least-Developed Countries (LDCs):</b> 49 Parties are LDCs, and are given special status under the treaty in view of their limited capacity to adapt to the effects of climate change.</li> </ul>

<b>Marrakesh CoP 7, 2001</b>	☀ Resulted in the <b>Marrakesh Accords</b> , setting the stage for ratification of the Kyoto Protocol.
<b>Bali CoP 13, 2007</b>	☀ Governments adopted the <b>Bali Road Map</b> , which includes the <b>Bali Action Plan</b> . The Road Map was a set of decisions that represented the various tracks that were seen as key to reaching a global climate deal.



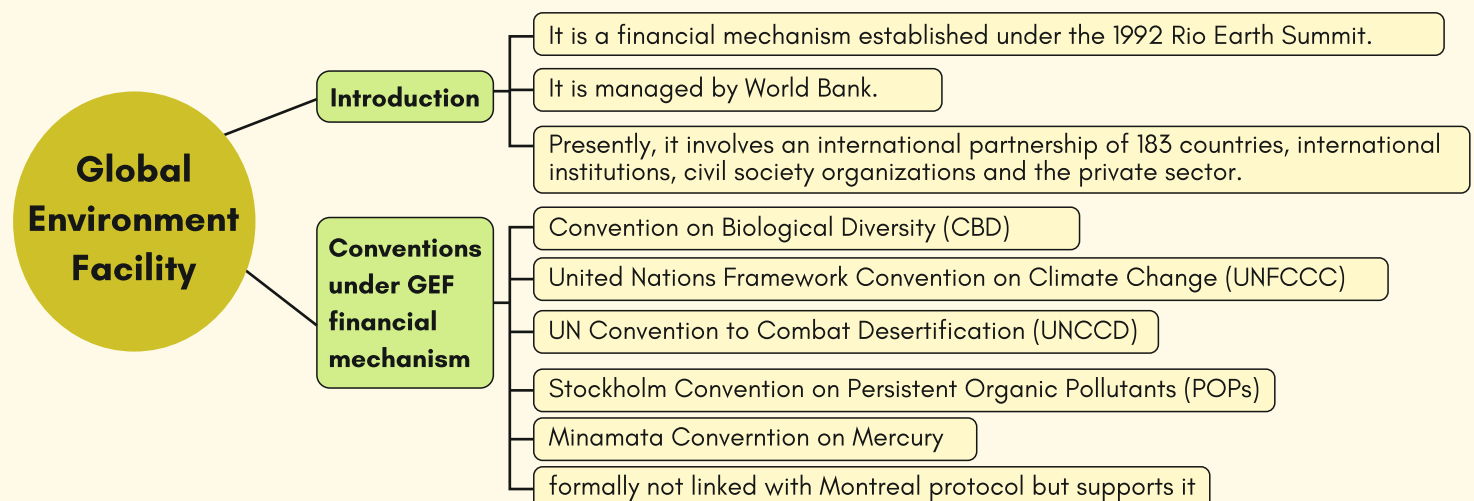


<b>Copenhagen CoP 15, 2009</b>	<ul style="list-style-type: none"> <li>It produced the <b>Copenhagen Accord</b>. The accord endorsed the continuation of the Kyoto protocol.</li> <li>Accord also lays the groundwork for financial commitments from developed countries to developing countries for climate change mitigation and adaptation efforts.</li> </ul>
<b>Cancun CoP 16, 2010</b>	<ul style="list-style-type: none"> <li>To commit to a maximum temperature, rise of 2 degrees Celsius above pre-industrial levels, and to consider lowering that maximum to 1.5 degrees in the near future.</li> <li>To establish a <b>Green Climate Fund</b> to provide financing to projects, programmes, policies and other activities in developing countries.</li> <li>Establishment of <b>Technology Mechanism</b> which included <b>Technology Executive Committee</b> and <b>Climate Technology Centre and Network</b>.</li> <li><b>Cancun Adaptation Framework</b>, which included setting up an Adaptation Committee to promote the implementation of stronger, cohesive action on adaptation.</li> <li>Developing countries submitted <b>nationally appropriate mitigation actions (NAMAs)</b>, to be implemented subject to financial and technical support.</li> </ul>
<b>Durban CoP 17, 2011</b>	<ul style="list-style-type: none"> <li>Continuation of the Kyoto Protocol till 2020 through a second commitment period.</li> <li>Launch of a new platform of negotiations for a new protocol by 2015 for the period beyond 2020.</li> <li>To conduct a fresh global review of the emerging climate challenge, based on the best available science and data.</li> </ul>
<b>Doha CoP 18, 2012</b>	<ul style="list-style-type: none"> <li>The <b>Doha Amendment to the Kyoto Protocol</b> was adopted for a second commitment period, starting in 2013 and lasting until 2020. However, it has not yet entered into force.</li> </ul>
<b>Warsaw CoP 19, 2013</b>	<ul style="list-style-type: none"> <li>Decisions towards a universal agreement in December 2015, which will enter into force in 2020</li> <li>Governments resolved to strengthen measures to close the "ambition gap". Established the <b>Warsaw International Mechanism for Loss and Damage</b>.</li> <li>Cutting emissions from deforestation – "the <b>Warsaw Framework for REDD+</b>".</li> </ul>
<b>Lima CoP 20, 2014</b>	<ul style="list-style-type: none"> <li>Both developed and developing countries pledged to take the capitalization of the new Green Climate Fund (GCF) past an initial \$10 billion target.</li> <li>The <b>Lima Ministerial Declaration on Education and Awareness</b> called on governments to put climate change into school curricula and climate awareness into national development plans.</li> <li>Lima Work Programme on Gender: to advance gender balance and to promote gender sensitivity in developing and implementing climate policy.</li> </ul>
<b>The Paris Agreement (CoP 21), 2015</b>	<ul style="list-style-type: none"> <li>A <b>legally binding</b> international treaty on climate change.</li> <li>Reaffirmed the goal of limiting global temperature increase to well below 2 degrees Celsius, while pursuing efforts to limit the increase to 1.5 degrees.</li> <li>The countries to implement <b>nationally determined contributions (NDCs)</b> on a 5– year cycle.</li> </ul>



<b>Marrakesh (CoP 22), 2016</b>	<ul style="list-style-type: none"> <li>☀ Countries negotiated to prepare the fine print for Paris deal. It sought to make the rules that would help in the implementation of the law i.e. Paris Agreement.</li> <li>☀ The countries have agreed to complete the rule book by 2018 as the Agreement would come into force from 2020.</li> </ul>
<b>Bonn Climate Meet (CoP- 23), 2017</b>	<ul style="list-style-type: none"> <li>☀ <b>Talanoa Dialogue:</b> It is a process designed to help countries implement and enhance their Nationally Determined Contributions by 2020.</li> <li>☀ The first ever <b>Gender Action Plan</b> to the UNFCCC was adopted here.</li> <li>☀ <b>Local communities and indigenous people's platform:</b> a new platform to include indigenous people's voices in the implementation of the Paris Agreement.</li> <li>☀ No financial commitments were agreed upon between the negotiating parties on the issue of <b>loss and damage</b>.</li> </ul>
<b>Katowice CoP 24, 2018</b>	<ul style="list-style-type: none"> <li>☀ All countries "shall" use the latest emissions accounting guidance from the IPCC.</li> <li>☀ Decided that the "adaptation fund" – a financial mechanism set up under the Kyoto Protocol – should continue under the Paris Agreement.</li> </ul>
<b>Madrid CoP 25, 2019</b>	<ul style="list-style-type: none"> <li>☀ <b>On Emission Reductions:</b> avoided strong language and setting a clear timeline for nations.</li> <li>☀ <b>On Loss and Damage:</b> noted that the Green Climate Fund (GCF) already supports activities relating to "loss and damage".</li> <li>☀ <b>Santiago Network</b> was established, for technical assistance to the most vulnerable countries.</li> <li>☀ <b>On Carbon Market:</b> Could not set rules for carbon markets under Article 6 of the Paris Agreement.</li> <li>☀ Decision was made on a new five-year <b>gender action plan (GAP)</b>, intended to "support the implementation of gender-related decisions and mandates in the UNFCCC process".</li> </ul>

## Financial Mechanisms





Least Developed Countries Fund (LDCF)		GEF/UNDP Small Grants Programme (SGP)	
<ul style="list-style-type: none"> <li>Established in 2001 by UNFCCC.</li> <li>The fund, managed by the GEF, supports the world's most vulnerable countries in their efforts to adapt to the effects of climate change. The LDCF is the only fund dedicated to supporting climate adaptation action in LDCs.</li> <li>It has helped countries prepare and implement National Adaptation Programs of Action (NAPAs), and also supports the National Adaptation Plan (NAP) process.</li> </ul>		<ul style="list-style-type: none"> <li>The program is funded by GEF and executed by the UNDP.</li> <li>It was launched alongside the Rio Earth Summit in 1992.</li> <li>It provides direct financial and technical support to communities and Civil Society Organizations for various projects that conserve and restore the environment while enhancing people's well-being and livelihoods.</li> <li>In India the program is hosted through the National Host Institution (NHI) i.e. - Centre for Environment Education (CEE) supported by MoE&amp;F.</li> </ul>	
Special Climate Change Fund (SCCF)		Green Climate Fund (GCF)	
<ul style="list-style-type: none"> <li>SCCF was established in response to guidance from the Conference of the Parties (COP7) in Marrakech in 2001.</li> <li>The SCCF complements the Least Developed Countries Fund (LDCF).</li> </ul>		<ul style="list-style-type: none"> <li>It was set up by the United Nations Framework Convention on Climate Change (UNFCCC) at Cancun CoP in 2010.</li> <li>World Bank is the Interim Trustee of the fund.</li> <li>GCF is the world's largest dedicated fund helping developing countries reduce their greenhouse gas emissions and enhance their ability to respond to climate change.</li> <li>GCF has a crucial role in serving the Paris Agreement.</li> <li>The Fund pays particular attention to the needs of societies that are highly vulnerable to the effects of climate change, in particular Least Developed Countries (LDCs), Small Island Developing States (SIDS), and African States.</li> </ul>	

## India and Climate Change

### National Action Plan on Climate Change (NAPCC)

NAPCC	Ministry	Major Objectives/Targets
National Solar Mission (NSM)	Ministry of New and Renewable Energy	<ul style="list-style-type: none"> <li>Achieve 100 GW of solar power in seven years starting from 2014-15.</li> </ul>
National Mission Enhanced Energy Efficiency (NMEEE)	Ministry of Power	<ul style="list-style-type: none"> <li>To achieve growth with ecological sustainability.</li> <li>Mandating reduction in energy consumption in large energy-consuming industries.</li> <li>Financing for PPP to reduce energy consumption through demand-side management programs in the municipal, buildings, and agriculture sectors,</li> <li>Energy incentives, including reduced taxes on energy-efficient appliances.</li> </ul>



NAPCC	Ministry	Major Objectives/Targets
National Mission for a Green India (GIM)	Ministry of Environment, Forest and Climate Change	<ul style="list-style-type: none"> <li>Improved ecosystem services by Increasing Forest/tree cover by 5 mha and improving quality of forest cover on another 5 m ha (a total of 10 mha).</li> </ul>
National Mission on Sustainable Habitat (NMSH)	Ministry of Housing and Urban Affairs	<ul style="list-style-type: none"> <li>Development of sustainable habitat standards.</li> <li>Promoting energy efficiency as a core component of urban planning by extending the existing Energy Conservation Building Code (ECBC).</li> <li>Strengthening the enforcement of automotive fuel economy standards, and</li> <li>Using pricing measures to encourage the purchase of efficient vehicles and incentives for the use of public transportation.</li> </ul>
National Water Mission (NWM)	Ministry of Jal Shakti	<ul style="list-style-type: none"> <li>Focuses on monitoring of groundwater, aquifer mapping, capacity building, water quality monitoring and other baseline studies.</li> <li>Promoting citizen and state action for water conservation, augmentation, and preservation.</li> <li>Focusing attention on overexploited areas.</li> <li>Promoting basin-level integrated water resources management.</li> </ul>
National Mission for Sustainable Agriculture	Ministry of Agriculture	<ul style="list-style-type: none"> <li>Enhancing food security by making agriculture more productive, sustainable, remunerative, and climate resilient.</li> </ul>
National Mission for Sustaining Himalayan Eco-systems	Ministry of Science and Technology	<ul style="list-style-type: none"> <li>To continuously assess the health status of the Himalayan Ecosystem. Enable policy bodies in their policy formulation functions.</li> <li>Start of new centres relevant to climate change in the existing institutions in the Himalayan States.</li> <li>Regional cooperation with neighboring countries in Glaciology.</li> </ul>
National Mission on Strategic Knowledge for Climate Change (NMSKCC)	Ministry of Science and Technology	<ul style="list-style-type: none"> <li>To gain a better understanding of climate science, formation of knowledge networks among the existing knowledge institutions engaged in research and development.</li> <li>Development of national capacity for modelling the regional impact of climate change on different ecological zones within the country.</li> </ul>



## National Adaptation Fund on Climate Change (NAFCC)

## Climate Change Action Programme (CCAP)

- It was launched in 2015 with an initial outlay of Rs. 350 crore to meet the cost of adaptation to climate change for the State and Union Territories of India that are particularly vulnerable to the adverse effects of climate change.
- The Scheme has been taken as Central Sector Scheme with National Bank for Agriculture and Rural Development (NABARD) as the National Implementing Entity (NIE).
- CCAP is a central scheme.
- It was approved in 2014 at a total cost of Rs. 290 crores for duration of five years.
- Its objective is to create and strengthen the scientific and analytical capacity for assessment of climate change in the country, putting in place appropriate institutional framework for scientific and policy initiatives and implementation of climate change related actions in the context of sustainable development.
- Some of the components include: the National Carbonaceous Aerosols Programme (NCAP), Long Term Ecological Observatories (LTEO), and Coordinated Studies on Climate Change for North East Region (CSCCNER).

## India's Second Biennial Update Report (BUR)

- It has been submitted to UNFCCC in December 2018.
- Emission intensity of India's GDP came down by 21% between 2005 & 2014 and its achievement of climate goal for pre-2020 period is on track.

## India's post-2020 climate goals

### India's National Determined contribution (NDC)

#### Goal 1

To put forward and further propagate a healthy and **sustainable way of living based on traditions and values of conservation and moderation.**



### India's National Determined contribution (NDC)

#### Goal 2

To adopt a **climate friendly and a cleaner path** than the one followed hitherto by others at corresponding level of economic development.







### India's National Determined contribution (NDC)

#### Goal 3

To **reduce the emissions intensity of its GDP by 33 to 35 percent by 2030 from 2005 level.**



### India's National Determined contribution (NDC)

#### Goal 4

To achieve about **40 percent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030** with the help of transfer of technology and low-cost international finance including from Green Climate Fund (GCF).



### India's National Determined contribution (NDC)

#### Goal 5

To create an **additional carbon sink of 2.5 to 3 billion tonnes of CO2 equivalent through additional forest and tree cover by 2030.**



### India's National Determined contribution (NDC)

#### Goal 6

To better **adapt to climate change by enhancing investments** in development programme in **sectors vulnerable to climate change**, particularly agriculture, water resources, Himalayan region, coastal regions, health and disaster management.



### India's National Determined contribution (NDC)

#### Goal 7

To **mobilize domestic and new & additional funds from developed countries** to implement the above mitigation and adaptation actions in view of the resource required and the resource gap.



### India's National Determined contribution (NDC)

#### Goal 8

To **build capacities, create domestic framework and international architecture for quick diffusion of cutting-edge climate technology** in India and for joint collaborative R&D for such future.





## Other Initiatives

### Energy Efficiency measures



- ☀ **Perform Achieve and Trade (PAT)**- Market based mechanism to enhance Energy Efficiency through certification of energy saving which can be traded.
- ☀ **Star Rated Appliances** to provide the consumer an informed choice about the energy saving and thereby the cost saving potential of the marketed household and other equipment.
- ☀ **Energy Conservation Building Code 2017** to establish minimum energy performance standards for buildings in India.
- ☀ **Street Lighting National Programme (SLNP)**: Deployment of LED street lights that are approximately 50% more energy efficient than incandescent bulbs and High-Pressure Sodium (HPS) lighting.
- ☀ **Unnat Jeevan by Affordable LEDs and Appliances for All (UJALA)** to address India's high cost of electrification and high emissions from inefficient lighting.
- ☀ **Green Rating for Integrated Habitat Assessment (GRIHA)** to recognize energy-efficient buildings, as well as to stimulate their large-scale replication
- ☀ **Zero Defect and Zero Effect (ZED)** to rate Micro, Small and Medium Enterprises (MSMEs) on quality control and certification for energy efficiency, enhanced resources efficiency, pollution control, use of renewable energy and waste management using ZED Maturity Assessment Model.

### Afforestation Measures



- ☀ **National Afforestation Programme** for afforestation and reforestation of degraded forests and non-forest areas.
- ☀ **Nagar Van Udyan Yojana**: Aims at ecological rejuvenation of the city forests by creating/ developing at least one city forest in each city having Municipal Corporation/ Class I Cities for providing wholesome healthy living environment.

### Promotion of Renewable Energy



- ☀ **Renewable energy targets**: Solar Energy (100 GW by 2022), Wind Energy (60 GW by 2022) and Small Hydro and Biomass (15 GW by 2022)
- ☀ **Green Energy Corridor Project** that aims at synchronizing electricity produced from renewable sources, such as solar and wind, with conventional power stations in the grid.
- ☀ **Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles in India (FAME India) under National Electric Mobility Mission Plan 2020** for promoting eco-friendly vehicles in the country - hybrid and electric technologies.

### Waste Management



- ☀ **Swachh Bharat Mission** for Solid Waste Management including the establishment of waste to energy plants
- ☀ **Steel Scrap Recycling Policy** to create a mechanism for treating waste streams and residues produced from dismantling and shredding facilities in compliance to **Hazardous & Other Wastes (Management & Transboundary Movement) Rules, 2016**.



## Agriculture



- ☀️ **Pradhan Mantri Krishi Sinchayee Yojana** for end-to-end solutions in irrigation supply chain and aims to use micro irrigation technologies extensively to save water, increase production and productivity of crops in a sustainable manner and help in achieving food security
- ☀️ **Rainfed Area Development (RAD)** to explore potential utilization of natural resources base/assets available/created through watershed development and soil conservation activities/interventions under MGNREGS, NWDPRA, RVP&FPR, RKVY, IWMP etc.

## Financial Tools



- ☀️ **Framework for Energy Efficient Economic Development (FEEED)** to ease the financing of energy efficiency projects.
- ☀️ **Energy Efficiency Financing Platform (EEFP)** to provide a platform to interact with Financial Institutions (FIs) and project developers for implementation of energy efficiency projects.
- ☀️ **Green bonds** issued by financial, non-financial or public entities where the proceeds are used to finance 100% green projects and assets specifically linked to climate-change mitigation, adaptation and resilience. India also has the second largest Emerging green bond market after China.
- ☀️ **Compensatory Afforestation Management and Planning Authority (CAMPA) Funds** for promoting afforestation and regeneration activities as a way of compensating for forest land diverted to non-forest uses.
- ☀️ India joined the **International Platform on Sustainable Finance (IPSF)** that acknowledges the global nature of financial markets which has the potential to help finance the transition to a green, low carbon and climate resilient economy by linking financing needs to the global sources of funding.

## International Collaborations



- ☀️ **International Solar Alliance (ISA)** to provide a dedicated platform for cooperation among solar-resource-rich countries, through which the global community, including governments, bilateral and multilateral organizations, corporates, industry, and other stakeholders, can contribute to help achieve the common goal of increasing the use and quality of solar energy in meeting energy needs of prospective ISA member countries in a safe, convenient, affordable, equitable and sustainable manner.
- ☀️ **Clean Development Mechanism** which allows emission reduction or removal projects in developing countries to generate carbon offset credit, each equivalent to one tonne of carbon dioxide. These certified emission reduction credits (CERs) could be traded, sold and used by industrialized countries to meet part of their emission reduction targets under Kyoto Protocol.
- ☀️ **REDD+** Reducing emissions to achieve additional carbon sequestration, emission reduction, improve forest-based livelihoods, conservation of rare, endemic, and endangered species found in the area and improvement of watershed hydrology.

## Others



- ☀️ **Smart Cities Mission** for providing a clean and sustainable urban environment through the adoption of 'smart solutions.
- ☀️ **Atal Mission for Rejuvenation and Urban Transformation (AMRUT)** for providing basic services (e.g., water supply, sewerage, urban transport) to households and build amenities in cities which will improve the quality of life for all, especially the poor and the disadvantaged is a national priority.



- 🌞 **Pradhan Mantri Ujjwala Yojana** for providing LPG connections to BPL households thus reducing the demand for traditional biomass from forests.
- 🌞 **National Policy on Biofuels – 2018** which aims at taking forward the indicative target of achieving 20% blending of bio-fuels with fossil-based fuels by 2030.
- 🌞 **Dedicated Freight Corridor** for construction of six freight corridors traversing the entire country to provide a safe and efficient low carbon freight transportation system

## Global Efforts Related to Ozone Depletion

